

Hiromu KOBAYASI*: Notes on the genus *Ceratoneis*
(Diatoms from River Arakawa-3)**

小林 弘*: ケラトネイス属について (荒川産ケイソウ類-3)

This very small genus includes only a few interesting forms, whose habitat is limited to running water. Since the generic name of *Ceratoneis* was given by Ehrenberg in 1840 to forms that have arcuate valves, the generic sense has undergone many changes. In his excellent work, "Die Kieselalgen", in Rabenhorst's Kryptogamen-Flora (1937), Hustedt dealt with the taxonomic history of this genus in detail and proposed the sense of Grunow in 1862 as a reasonable one. The following characters seem to distinguish *Ceratoneis* from the remainder.

- (1) arcuate valve.
- (2) central inflation of the ventral side of the valve.
- (3) palm-shaped colony type, a modification of the hand-shaped colony.

Among the foregoing characters, Hustedt considers (1) as the main feature. On the other hand, Cleve-Euler moved *Ceratoneis* into *Fragilaria* in her recent work, "Die Diatomeen von Schweden und Finnland, 1953", regarding the band-like colony shape as the most important. In spite of the foregoing opinions, these two characters are very unstable in the Arakawa material. As illustrated in Fig. 1-3, most Arakawa individuals are recti-linear in valve view. Even in rather smaller specimens exhibiting a remarkable dorsi-ventral difference (Fig. 4), the pseudo-raphe still appears as a straight line. As to colony shape, Arakawa forms differ a little from that of European ones. Cells occur solitary or in flat band-shaped colonies (Fig. 5) but not in palm-shaped colonies, thus, the generic limits of *Ceratoneis* should be revised.

The characters that seem to be more stable are central inflation and its morphological generality of thickened, strongly reflective outer margin and reduced thin central part on which indistinct traces of transapical striations are usually visible. *Fragilaria intermedia* and *Synedra vaucheriae* are included in this genus because of their peculiar central inflation and of their living solitary or in band-shaped colonies.

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** 1: in Bull. Chichibu Museum Nat. Hist. No. 11, 33-40, 1962; 2: l.c., No. 12, 65-77, 1964.

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Genus **Ceratoneis** Ehr. emend Grun.

Ehrenberg, Abh. Berl. Akad., Pl. 4, 1840; Grunow, Verh. zool.-bot. Ges. Wien, 12: 343, 1862.

Forms found in the area are the following four species and varieties, in which two are new combinations.

1. **Ceratoneis arcus** var. **hattoriana** Meist., in Arch. f. Hydrobiol., 9: 226, Pl. 8, Fig. 1, 2, 1914; Iwahashi, Journ. Jap. Bot., 12 (6): 391, Fig. 1j-k, 1936; H. Kobayasi, Bull. Chichibu Museum Nat. Hist., No. 12, 66, Fig. 1a-c, 1946.

Valves somewhat slender in appearance, slightly arcuate, with angularly convexed dorsal and straight ventral side. Pseudo-nodule excentric forming a distinct central inflation. Pseudo-raphe linear, narrow, slightly bending in the middle. Commonly seen in canyon section.—Fig. 6.

2. **Ceratoneis arcus** var. **recta** Cleve ex Krasske, in Arch. f. Hydrobiol., 35: 361, Pl. 10, Fig. 21, 1939; Cleve-Euler, K.V.A. Handl., 4 (1): 54, Fig. 373h-k, 1953; H. Kobayasi, in Bull. Chichibu Museum Nat. Hist., No. 12, 66, Fig. 2a-i, 1964.

Synonym: *Fragilaria aequalis* var. *inaequidentata* Lagers., Diat. Spetsb., 16, Pl. 2, Fig. 1, 1873; *Fragilaria arcus* Cleve var. *recta* Cleve, Bih. K.V.A. Handl., 24: (2): 9, 1889; *Ceratoneis amphioxys* var. *recta* Skvortzow, in Proc. Sungaree River Biol. St., 1 (5): 8, Pl. 1, Fig. 11, 1928; *Ceratoneis recta* Iwahashi, in Journ. Jap. Bot., 12 (6): 391, Fig. 1 a-c, 1936; *Ceratoneis recta* form. *subarcus* Iwahashi, l.c., Fig. 1 d-f.

Cells linear-straight, quadrangular in girdle view, living solitary or in band-shaped colonies. Valves recti-linear, or elliptic in dwarf individuals, with distinct central inflation. Apical axis and pseudo-raphe straight; 20-80 μ long, 6-7 μ broad. Striae 13-14 per 10 μ . One of the most abundant algae in the area.—Fig. 1-5.

3. **Ceratoneis vaucheriae** (Kuetz.) H. Kobayasi comb. nov., in Bull. Chichibu Museum Nat. Hist., No. 12, 66, Fig. 3, 9, 1964 (nom. nud.).

Synonym: *Exilaria vaucheriae* Kuetz., Sy. Diat., 32, Fig. 38, 1834; *Frusturia anceps* Kuetz., l.c., 23, Fig. 19; *Frusturia parvula* Kuetz., l.c., Fig. 20; *Synedra vaucheriae* Kuetz., Bacill., 65, Pl. 14, Fig. IV, 2a, 3, 1844; *Synedra minutissima* Kuetz., l.c., 63, Pl. 3, Fig. 30; *Synedra parvula* Kuetz., l.c., 64,

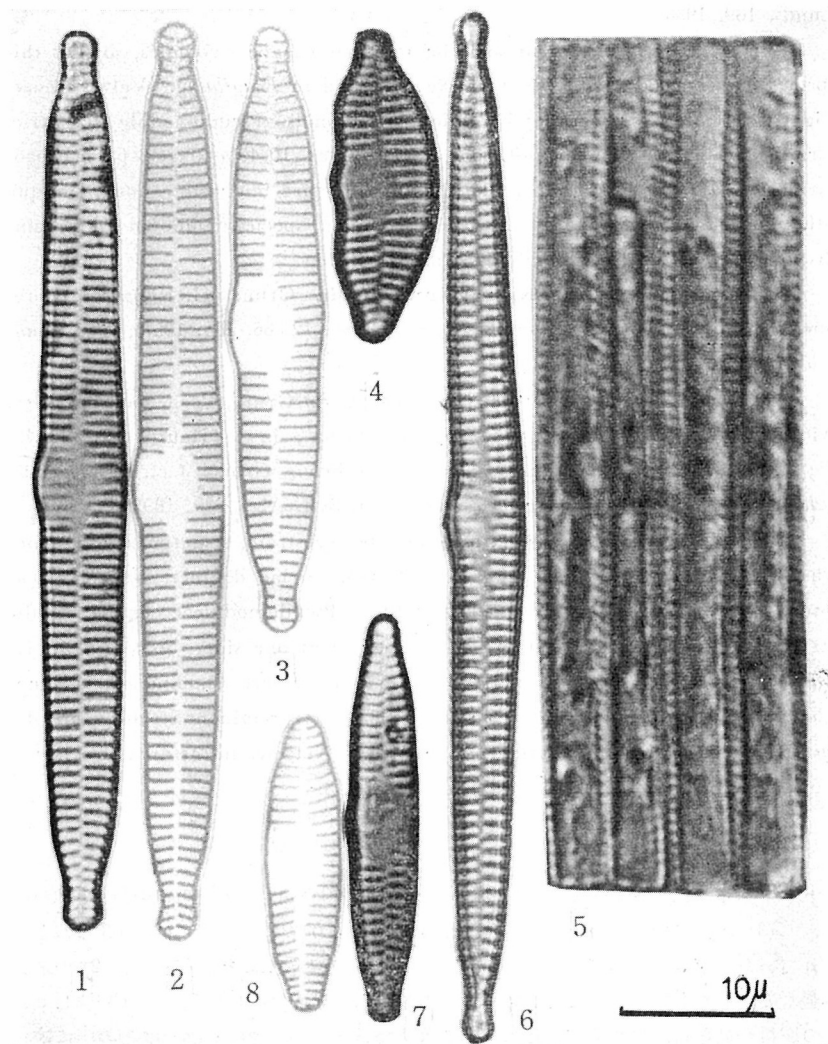


Fig. 1-5. *Ceratoneis arcus* var. *recta*. 6. *C. arcus* var. *hattoriana*.
7, 8. *C. vaucheriae* var. *intermedia*.

Pl. 14, Fig. 1a, b, Pl. 30, Fig. 32; *Synedra vaucheriae* var. *genuina* form. *typica*, form. *lanceolata*, form. *brevis*, var. *rhomboides* A. Mayer, Bayer. Krypt. Forsch., 4: 197, Pl. 5, Fig. 66-72, 75, 1919; *Fragilaria vaucheriae* Boye Pet., Bot. Not.

Lund., 169, 1938.

Cells sometimes solitary or sometimes in band-shaped colonies, so that this species has been included both in *Synedra* and in *Fragilaria*. Valves linear, slightly rostrate or sometimes capitate at the ends. Pseudo-nodule eccentric, forming a distinct central inflation at one side; 10–40 μ long, 3–6.5 μ broad. Striae fine and subtle 15–17 per 10 μ , punctae obscure but visible under oblique illumination, about 32 per 10 μ . A very common species, found in all streams in the area and in great numbers at many stations.

4. *Ceratoneis vaucheriae* var. *intermedia* (Grun.) H. Kobayasi comb. nov., in Bull. Chichibu Museum Nat. Hist., No. 12, 66, Fig. 10a-c, 1964 (nom. nud.).

Synonym: *Fragilaria mutabilis* var. *intermedia* Grun., Verh. zool.-bot. Ges. Wien, 12: 369, 1862; *Fragilaria intermedia* Grun., in V. Heurck Sy., Pl. 45, Fig. 9–11, 1881; *Synedra vaucheriae* var. *deformis* Grun., l.c., Fig. 17, 19; *Odontidium mutabilis* var. *intermedia* De Toni, Syll. Alg., 639, 1892.

Valves linear-lanceolate, slightly attenuate to rostrate, sometimes with somewhat capitate ends; 10–60 μ long, 2–5 μ broad. Striae distinct, 9–14 per 10 μ . Punctae somewhat distinct, about 40 per 10 μ . Pseudo-nodule eccentric, resulting in a distinct central inflation of the margin at one side. As shown in H. Kobayasi (l.c. Fig. 10a), valves of small individuals are rhombic in outline. This variety is distinguishable from the type by its prominent striation and by the somewhat distinct punctuation of the striae. Not rare in the area, but never found in great numbers at any station.—Fig. 7, 8.

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ケラトネイス属を決定する形質としては、(1) 殻面の湾曲、(2) 殻面腹側中央部の膨らみ、(3) 単独で生活するか、または帯状か手の平状の群体を形成する、の3つが挙げられていた。筆者は荒川産のケラトネイス属について調査した結果、とくに(2)の形質が最も安定した形質であることを認めた。この膨みは帯面壁および周辺部は肥厚し強い光の屈折が見られ、中心部では、しだいに薄くなっている。またしばしばその上に退化した条線の根跡が見られる。このような形質を備えた *Fragilaria intermedia*, *Synedra vaucheriae* は当然ケラトネイス属に包括されるべき種類であると思われる。(1)の形質は、殻面観も殻の中心を通る縦溝も直線をなしていて、全く湾曲の見られない種類があり、また(3)の群体構造も、単独で生活する個体、*Synedra* 型の群体を形成する個体、*Fragilaria* 型の帯状の群体を形成するものが同時に見つかり非常に不安定であった。